
San Francisco Bay Regional Water Quality Control Board

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To: Terry Fleming
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U.S. Environmental Protection Agency

From: Bruce H. Wolfe
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Subject: Justification for Placing Eleven Trash-Impaired Waterbodies in the San Francisco Bay Region into Category 4b of the Impaired Waters (303d) List.

Section 303(d) of the Clean Water Act requires states to develop lists of water bodies impaired by a pollutant for which a Total Maximum Daily Load (TMDL) must be developed. U.S. EPA regulations recognize that by using other pollution control requirements, states may resolve the impairment without a TMDL. Waterbodies for which alternatives to TMDLs will be used to resolve the impairment are referred to as Category 4b waters as described in U.S. EPA's Integrated Reporting Guidance (IRG) for Sections 303(d)¹.

As part of the 2014/2016 Integrated Report, the San Francisco Bay Regional Water Quality Control Board (Water Board) proposes to move eleven waterbodies impaired only by trash from Integrated Report Category 5 to Category 4b. The IRG requires states to demonstrate the suitability of placing waters in Category 4b by providing to U.S. EPA a rationale supporting their conclusion that there are "other pollution control requirements" sufficiently stringent to achieve applicable water quality standards within a reasonable period of time.

Specifically, this rationale should include the following: (1) a statement of the problem causing the impairment; (2) a description of the proposed implementation strategy and supporting pollution controls necessary to achieve water quality standards, including the identification of point and nonpoint source loadings that when implemented assure the attainment of all applicable water quality standards; (3) a reasonable schedule for implementing the necessary pollution controls, (4) an estimate or projection of the time when water quality standards will be met; (5) a description of, and schedule for, monitoring milestones for tracking and reporting progress to U.S. EPA on the implementation of the pollution controls; and (6) a commitment to revise as necessary the implementation strategy and corresponding pollution controls if progress towards meeting water quality standards is not being shown. This memorandum constitutes the rationale for the placement of these eleven waterbodies into Category 4b and addresses each of these six elements in turn.

¹ **Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act.** Diane Regas (Director Office of Wetlands, Oceans and Watersheds). United States Environmental Protection Agency. July 29, 2005.

US EPA Integrated Report Requirements for Category 4b

1. Identification of segment(s) and statement of problem causing the impairment

The Water Board proposes moving the eleven trash-impaired water bodies shown in Table 1 from Category 5 (TMDL required) to Category 4b of the Impaired Waters List. There are additional waterbodies (not shown in Table 1) in the San Francisco Bay Region impaired by trash that must remain in Category 5 because they are also impaired by pollutants other than trash and may require a TMDL for those other pollutants.

Table 1: Trash-Impaired Waterbodies to be Placed in Category 4b of 303(d) List

Baxter Creek (Contra Costa Co.)	Cerrito Creek	Colma Creek
Damon Slough	Grayson Creek	Old Alameda Creek
Rindler Creek	San Tomas Aquinas Creek	Sausal Creek
Silver Creek (Santa Clara Co.)	Strawberry Creek (Alameda Co.)	

The waterbodies shown in Table 1 proposed for placement in Category 4b were all originally identified as trash-impaired as part of California's 2010 Integrated Report submission to U.S. EPA. The Staff Report² for the San Francisco Bay Region's portion of the 2010 303(d) List described how available trash data were evaluated to make the listing determinations. The Staff Report explained that several beneficial uses may be adversely impacted by trash, including recreation, aquatic life, wildlife habitat, and navigation. However, data were not readily available to allow staff to evaluate all beneficial uses possibly impaired by trash. Instead, we focused our impairment assessment on non-contact water recreation, and wildlife habitat beneficial uses because these uses can be most easily evaluated through review of available trash data.

The impairment determination was based on data collected through the Water Board's rapid trash assessment (RTA) method³. The RTA evaluates six parameters of trash impacts (level of trash, number of items found, threat to wildlife, threat to human health, illegal dumping, and trash accumulation). Water Board staff evaluated the magnitudes of the "level of trash" and "threat to aquatic life" parameters.

The Water Board determined that the non-contact recreation beneficial use was not supported in a waterbody if the "level of trash" RTA parameter was in the "poor condition" range – a score corresponding to a level of trash that "distracts the eye on first glance". Stream, bank surfaces, and immediate riparian zone contain substantial levels of litter and debris. This score suggests that the site is being used frequently by people: many cans, bottles, food wrappers, blankets, and clothing.

Water Board staff used the "threat to aquatic life" RTA parameter to assess impairment to wildlife habitat beneficial uses because the type of trash measured by this parameter⁴ is particularly problematic for wildlife (including aquatic life). The two primary problems that trash poses to wildlife are entanglement and ingestion. Mammals, turtles, birds, fish, and crustaceans all have been affected by entanglement in or ingestion of floatable debris. Many of the species most vulnerable to the problems of floatable debris are endangered or threatened.

² **Evaluation of Water Quality Conditions For The San Francisco Bay Region - Proposed Revisions to Section 303(d) List.** San Francisco Bay Regional Water Quality Control Board. October 2008.

³ **A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams.** April 2007.

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/surfacemonitoring/rb2swamptr/ashrpt06152007.pdf

⁴ Wildlife and aquatic life are threatened by buoyant litter such as hard or soft plastics, balloons, styrofoam, cigarette butts; toxic items such as batteries, lighters, or spray cans; large clumps of yard waste or dumped leaf litter; or large amounts of settleable glass or metal.

2. Description of proposed implementation strategy and supporting pollution controls necessary to achieve water quality standards

The implementation strategy to achieve water quality standards (WQS) for the trash-impaired waterbodies listed above is to implement, through National Pollutant Discharge Elimination System (NPDES) permits and other regulatory mechanisms, the Amendments to the Water Quality Control Plan for Ocean Waters of California to Control Trash and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries of California (collectively the “Trash Amendments”)⁵. The Trash Amendments contain implementation procedures to achieve and maintain WQS for trash including institutional controls such as increased litter reduction, street sweeping, and capture of trash in storm water systems and industrial settings.

The Trash Amendments do the following: (1) establish a narrative water quality objective for trash; (2) define the applicable waters; (3) establish a prohibition on the discharge of trash; (4) provide implementation requirements for permitted storm water and other discharges; (5) set a time schedule for compliance; and (6) provide a framework for monitoring and reporting requirements.

The trash discharge prohibition applies to NPDES permits, Waste Discharge Requirements (WDRs), and waivers to WDRs. Stormwater permittees covered by municipal separate storm sewer system (MS4) permits may achieve compliance through the installation of full capture devices on all storm drains in priority trash generating land uses. Alternatively, these stormwater permittees may achieve compliance through any combination of full capture devices, multi-benefit projects, other treatment controls and/or institutional controls, so long as it can be established through monitoring that they meet the same level of treatment as installation of full capture devices in all priority land uses. These implementation measures will reduce the impacts from trash in California waters through permit requirements and increased monitoring and assessment of impairment in state waters due to trash.

Trash Provisions of the San Francisco Bay Region MS4 NPDES Permit

The primary regulatory mechanism for implementing the Trash Amendments in the San Francisco Bay Region is the Municipal Regional Stormwater Permit for MS4s (MRP, Order No. R2-2015-0049 and its subsequent reissuance). The eleven trash-impaired waterbodies in Table 1 are all contained within municipalities that are MRP Permittees and must comply with the following trash-related provisions in the MRP.

Trash Reduction Requirements: The MRP includes compliance deadlines for a 70 percent trash load reduction (from 2009 levels described below) by 2017 and for an 80 percent trash load reduction by 2019. The reductions called for in the current MRP are interim milestones along a pathway to achieving 100 percent trash load reductions (or no adverse trash impact) by 2022.

The overarching strategy for reducing trash in MS4s involves mapping trash generation areas within a Permittee’s jurisdiction, then applying effective trash reduction actions to the areas of trash generation and assessing the effectiveness of those actions until trash generation is reduced to the “no impact” level over a Permittee’s entire jurisdiction. The Permittees reported trash generation maps as part of their Long Term Trash Reduction Plans in February, 2014⁶, and these maps provide the 2009 trash generation levels, which were required by a previous permit. Permittees developed their 2009 generation maps by dividing their jurisdiction into very high, high, moderate, and low trash generation areas based on the following ranges of trash generation rates: Low = less than 5 gal/acre/yr; Moderate = 5-10 gal/acre/yr; High = 10-50 gal/acre/yr; and Very High = greater than 50 gal/acre/yr.

⁵ These amendments were adopted by the California State Water Resources Control Board (State Water Board) as Resolution 2015-0019 on April 7, 2015, and approved by U.S. EPA Region 9 on January 12, 2016.

⁶ https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/C10/2014/index.html

Actual trash loading values, particularly in areas of high and very high trash generation areas, may vary significantly, but these delineated ranges provide a frame of reference for tracking and demonstrating trash load reductions. Permittees likely will need to reduce trash generation to at least “low” to attain the ultimate required water quality-based outcome of no trash loads that cause or contribute to adverse trash impacts in receiving waters, i.e., the 2022 goal. Whether attainment of low trash generation rates is sufficient (to eliminate trash impacts) will be evaluated and considered in the development of requirements in the next permit. Demonstration that trash management actions reduce trash generation from very high, high, or moderate to a low trash generation rate during this permit term provides a practicable means of demonstrating trash load reduction and attainment of the 2017 and 2019, 70 and 80 percent trash load reduction requirements, respectively.

Mandatory Minimum Full Trash Capture Systems: The MRP requires Permittees to install and maintain a mandatory minimum number of full trash capture devices to treat runoff from an area equivalent to 30 percent of retail/wholesale land area that drains to the storm drain system within their jurisdictions. A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate resulting from a one-year, one-hour, storm in the sub-drainage area or designed to carry at least the same flow as the storm drain connected to the inlet. The device(s) must also have a trash reservoir large enough to contain a reasonable amount of trash safely without overflowing trash into the overflow outlet between maintenance events. Types of systems certified⁷ by the State Water Board are deemed full capture systems.

Trash Implementation Measures for Caltrans

California Department of Transportation (Caltrans) designs and operates California’s state highway system. Caltrans’ operation of this linear transportation system requires that it have its own NPDES stormwater permit distinct from the MS4 permits for municipalities with regulatory authority over land uses. Based on information from Caltrans’ trash studies, the Trash Amendments focus Caltrans’ compliance efforts on the significant trash generating areas within the state’s linear transportation system. Significant trash generating areas may include areas such as the following: (1) highway on- and off- ramps in high-density residential, commercial, mixed urban, and industrial land uses; (2) rest areas and park-and-rides; and (3) state highways in commercial and industrial land uses. To comply with the prohibition of discharge of trash, Caltrans must comply with requirements in all significant trash generating areas by installing, operating, and maintaining any combination of full capture systems, multi-benefit projects, other treatment controls, and/or institutional controls. Caltrans must demonstrate that such combination of controls achieves full capture system equivalency.

3. Reasonable schedule for implementing necessary pollution controls

Waterbodies in the San Francisco Bay Region were placed on the 303(d) List for impairment by trash in 2010. These listings focused more attention on the trash problem and motivated increased activity and control measure implementation by municipalities in the region. The first version of the MRP (order No. R2-2009-0074⁸) in 2009 required Permittees to prepare long-term trash reduction plans⁹ in which they quantified baseline rates of trash generation throughout the permit area, and these baseline rates now serve as the basis of trash reduction requirements in the current MS4 permit and also as a guide for prioritization of control measures. Although trash is a ubiquitous problem and levels are quite high in certain portions of the region’s watersheds¹⁰, effective control measures are

⁷ https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/a1_certified_fcd_rev04aug17.pdf

⁸ https://www.waterboards.ca.gov/rwqcb2/board_decisions/adopted_orders/2009/R2-2009-0074.pdf

⁹ https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/C10/2014/index.html

¹⁰ Lower watershed sites typically have higher densities of trash. Trash source hotspots include: parks, schools, or poorly-kept commercial facilities located near creek channels. These source hotspots appear to contribute a significant portion of the trash deposition at lower watershed sites. Homeless encampments and creekside litter from

readily available and are already being implemented. Here are some of the categories of trash control measures that might appear in the long-term trash reduction plan for an urbanized municipality like Oakland¹¹.

- Public Outreach and Education
- Product Bans – e.g., polystyrene containers, single use plastic bags
- Installation of Partial and Full Trash Capture Devices
- Trash Cleanup (e.g., volunteer efforts)
- Street Sweeping
- Enforcement on Illegal Dumping
- Trash Containment for Commercial Areas
- Homeless Encampment Management

The MRP includes compliance deadlines of 70 percent trash load reduction (from 2009 levels described below) by 2017, 80 percent trash load reduction by 2019, and 100 percent trash load reductions (or no adverse trash impact) by 2022. The pace at which trash control measures can be implemented varies. Many of them are already in place or can be implemented within a few years. Trash is a solvable problem in that the control measures are not complicated or prohibitively expensive. Success is achievable in the short to medium term if there is ongoing political will and adequate resources are dedicated to solving the problem over time.

4. An estimate of timeline for achieving WQS

The original trash impairment determinations were based on evidence (trash surveys and photographic documentation) that trash levels in some creeks and shoreline areas were impairing the non-contact recreation and wildlife habitat beneficial uses. We will consider WQS attained when trash levels in waterbodies have been reduced to the point where these (and by presumably by extension other) uses are not impaired. This demonstration will require the collection and review of water quality monitoring evidence (see below). We can, however, suggest that the timeline for the achievement of WQS will be similar if not identical to the timeline for control measure implementation.

Unlike legacy pollutants such as persistent organic pesticides, PCBs or mercury, trash does not accumulate in sediments to form a pollutant reservoir that retards achievement of WQS long after ongoing sources have been controlled. Rather, trash levels in waterways respond relatively rapidly to control measure implementation. The trash on creek banks and shoreline areas is often material that has been transported from watershed source areas relatively recently (days to months). Therefore, we expect that achieving the trash reduction goals (100 percent trash load reduction or no adverse trash impacts) by 2022 will result in achievement of WQS (no impairment non-contact recreation and wildlife beneficial uses) in roughly the same time frame.

In Section 3 above, we described some of the typical control measures that urbanized municipalities will employ to control trash. Most of these can be deployed relatively rapidly, but there are some source areas (e.g., homeless encampments) and source processes (e.g., illegal dumping) that are very challenging problems to solve. For those waters in which a significant amount of trash results from difficult to control source areas or processes, the achievement of both the trash reduction goals and WQS may be somewhat delayed beyond 2022. Gaining insights into these difficulties and responding appropriately with modified control strategies will be discussed in Section 6 below.

a variety of sources is a significant source of trash directly dumped and placed in the riparian zone where it can be swept into receiving waters by storm flows.

¹¹ The Oakland trash reduction plan is here:
https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/C10/2014/Alameda_County/Oakland_2-14_Trash_Long_Term.pdf

5. Monitoring plan to track effectiveness of pollution controls

In accordance with the Trash Amendments, the Water Boards must require monitoring and reporting requirements (with monitoring objectives) in MS4 and Caltrans permits to ensure adequate trash control. The requirements in the final Trash Amendments represent the minimum requirements to be included in such permits.

MRP requirements for demonstration of outcomes and monitoring

Because trash is not like other water pollutants that may be readily quantified through typical sampling and laboratory methods, a major emphasis in the MRP is placed on how trash reduction outcomes should be demonstrated by Permittees. These include monitoring activities to assess environmental condition, but also – because making progress on trash pollution is so closely tied to control measure implementation – tracking progress on various implementation elements as well.

One element of tracking progress involves tracking information related to implementation of full trash capture. Permittees must maintain these systems to prevent plugging and make available for inspection and review the documentation of the design, operation, and maintenance of each of their full trash capture systems, including the mapped location and drainage area served by each system. Permittees must also inspect devices in high or very high trash generation areas at least two times per year, with the inspections spaced at least three months or more apart. Permittees must also certify annually that each of their full trash capture systems is operated and maintained to meet full trash capture system requirements.

The primary tool currently available for determining trash reduction success and positive outcomes is visual assessment, with photo documentation of trash generation and conditions in areas that drain to storm drains. Visual assessment involves observing a sufficient portion of each, e.g., sidewalk and curb area, at a frequency that adequately represents the trash management area condition relative to the type(s) of management actions implemented in the area. The frequency of required visual assessments depends on the rate of trash generation, the sources and types of trash, trash management actions deployed, and time of year. During the wet season, October through April, visual assessments in a trash management area must be conducted at a frequency that determines whether there may be trash discharges to the storm drain system from sources or areas of trash accumulations before a trash management action or combination of actions is implemented or between recurring trash management actions. Frequency of visual assessments during the dry season, May through September, should be at least once per quarter, including, and preferably, within the month (September) before the wet season begins. Higher frequencies of visual assessments than those illustrated above may be required to demonstrate effectiveness of trash control actions and claimed trash reduction.

The MRP also requires receiving water monitoring for trash to provide additional evidence of improvement and to verify that full trash capture systems and other trash management actions are preventing trash from discharging into receiving waters and whether additional actions may be associated with sources within a Permittee's jurisdiction. Receiving water monitoring can also show whether there are ongoing sources outside of the Permittee's jurisdiction that are causing or contributing to adverse trash impacts in the receiving water(s).

There are currently no standard methods and protocols for monitoring trash in receiving waters. However, the Bay Area Stormwater Management Agencies Association is developing and testing some trash monitoring tools and protocols via a California Proposition 84 grant funded project (Agreement # 12-420-550), *Tracking California's Trash*. During this Permit term, the Permittees will develop and test trash receiving water monitoring tools and protocols designed, to the extent possible, to answer the following questions:

- Have a Permittee's trash control actions effectively prevented trash within a Permittee's jurisdiction from discharging into receiving water(s)?

- Is trash present in receiving water(s), including transport from one receiving water to another, e.g., from a creek to a San Francisco Bay segment, at levels that may cause adverse water quality impacts?
- Are trash discharges from a Permittee's jurisdiction causing or contributing to adverse trash impacts in receiving water(s)?
- Are there sources outside of a Permittee's jurisdiction that are causing or contributing to adverse trash impacts in receiving water(s)?

The monitoring tools and protocols may include direct measurements and/or observation of trash in receiving waters. In scenarios where direct measurements or observations are not feasible, surrogates for trash in receiving waters, such as measurement or observation of trash on shorelines or creek banks may provide a practicable means of monitoring trash. This includes consideration and appropriate simplification of the shoreline and creek bank RTA mentioned previously. Permittees must submit a preliminary report on the proposed monitoring program by July 1, 2019, a year in advance of the final proposed monitoring program due July 1, 2020, six months before the Permit expires. This should allow for early resolution of some monitoring program issues that are not dependent on completion of tests.

The Caltrans permit contains requirements that Caltrans develop and implement annual monitoring plans that demonstrate the effectiveness of the selected combination of treatment and institutional controls and compliance with full capture system equivalency. The annual monitoring reports would be provided to the State Water Board and the reports must include a GIS map with the locations of each of the treatment controls and institutional controls. In addition to the GIS map, each annual monitoring report should consider a number of questions designed to demonstrate the effectiveness of the selected controls and compliance with full capture system equivalency.

6. Commitment to frequently review and revise pollution controls, as necessary

Resolving trash impairments will be challenging but not impossible. Many of the control measures (full trash capture, enforcement, trash containment) are straightforward and their success is limited only by the will to implement and available resources. Managing the contribution from homeless encampments and illegal dumping will be more difficult, but there are strategies for addressing these as well, but the evolution of novel strategies may be necessary in these areas as we find out what works and what does not.

Since the primary mechanism for implementing the Trash Provisions is the MRP, there is a natural process for reviewing and revising pollution controls through the re-issuance, every five years, of the MRP as well as the Caltrans permit.

We have a plan of control measure implementation through the MRP that will result in trash reductions over the next few years. In addition, there will be visual assessment and receiving water monitoring results that will measure progress toward the goal of no adverse impacts by the year 2022. How reality matches that reduction goal will determine if additional or different control measures should be put in place through the regulatory mechanisms available to the Water Board. The Water Board is committed to solve the trash problem, and we will use the reissuance of these and other regulatory vehicles as an opportunity to fine tune implementation measures needed to solve the problem.